



FIG 1
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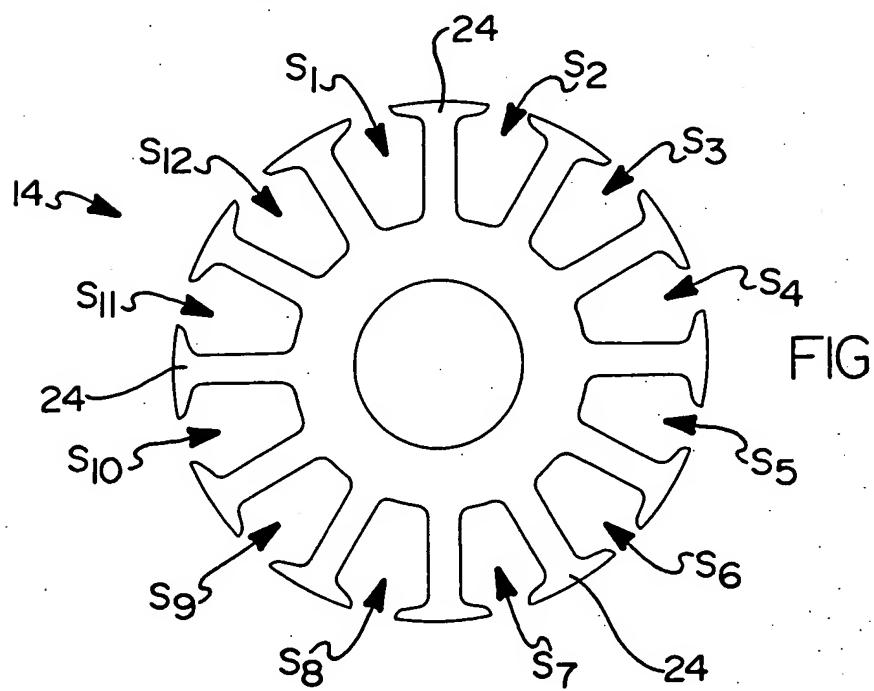
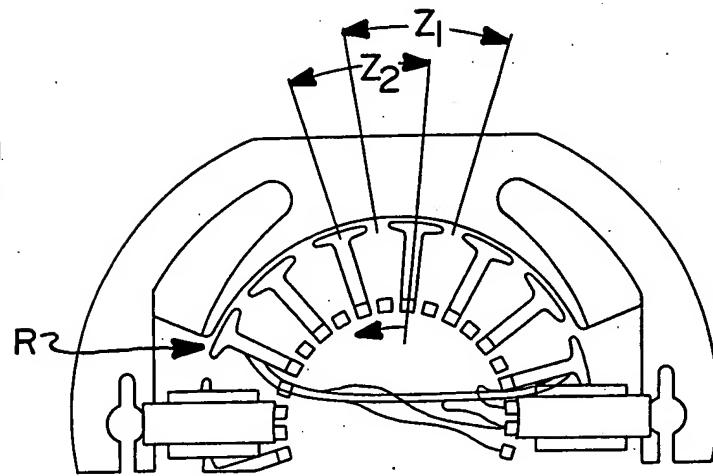


FIG 3

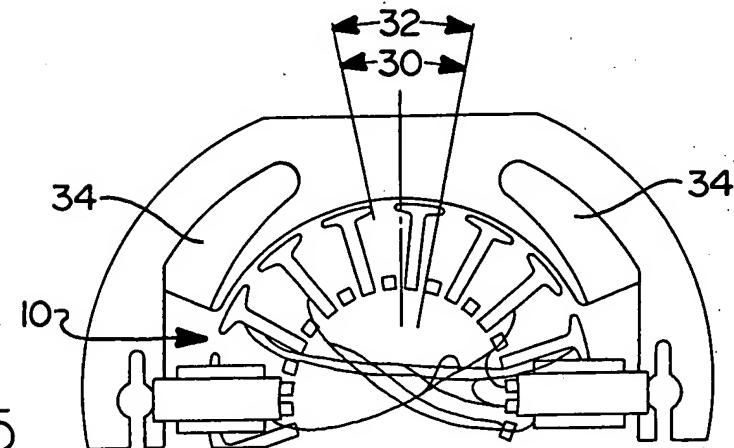


FIG 5

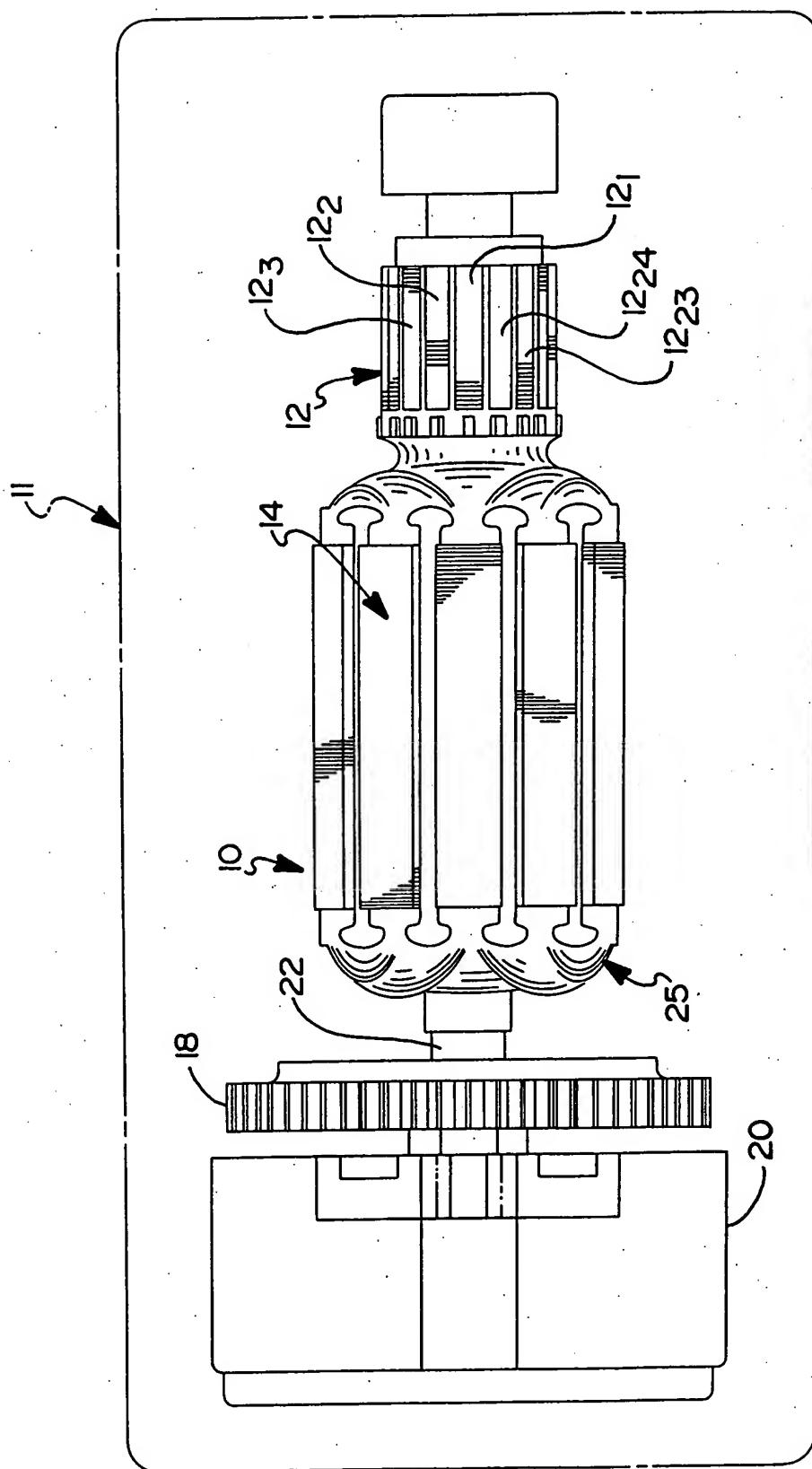
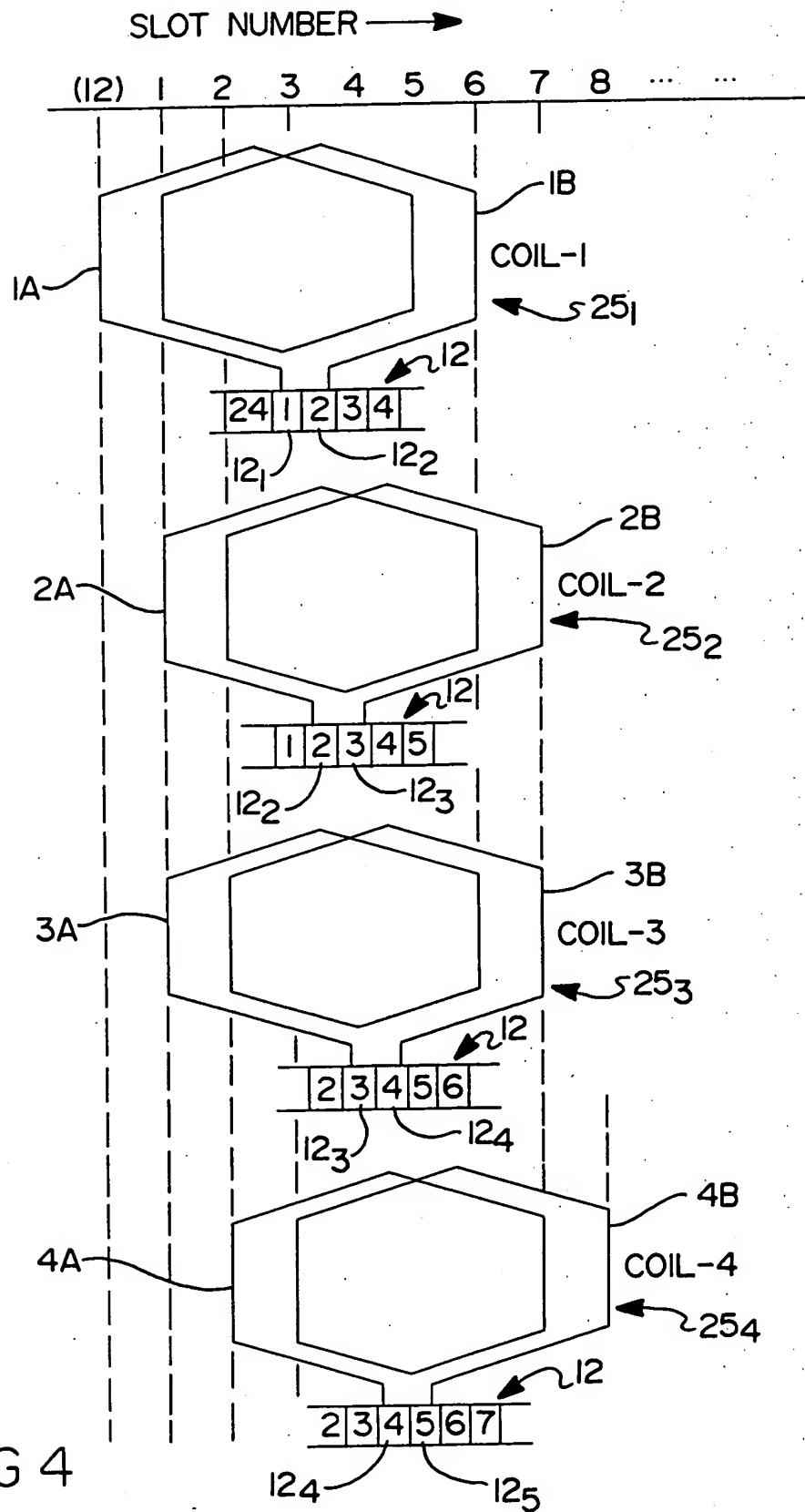
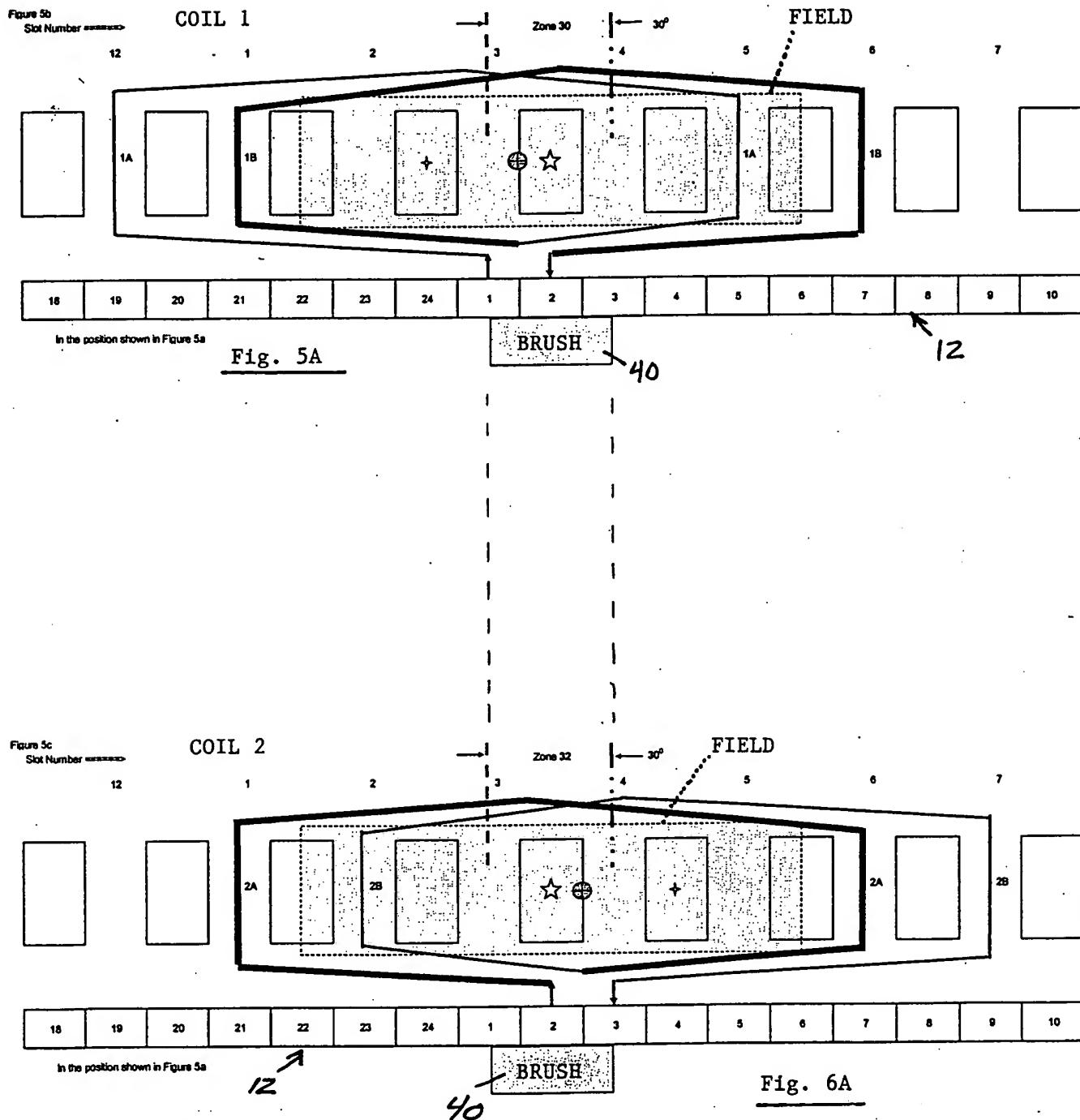


FIG 2





Key: ☆ Magnetic axis of larger subcoil

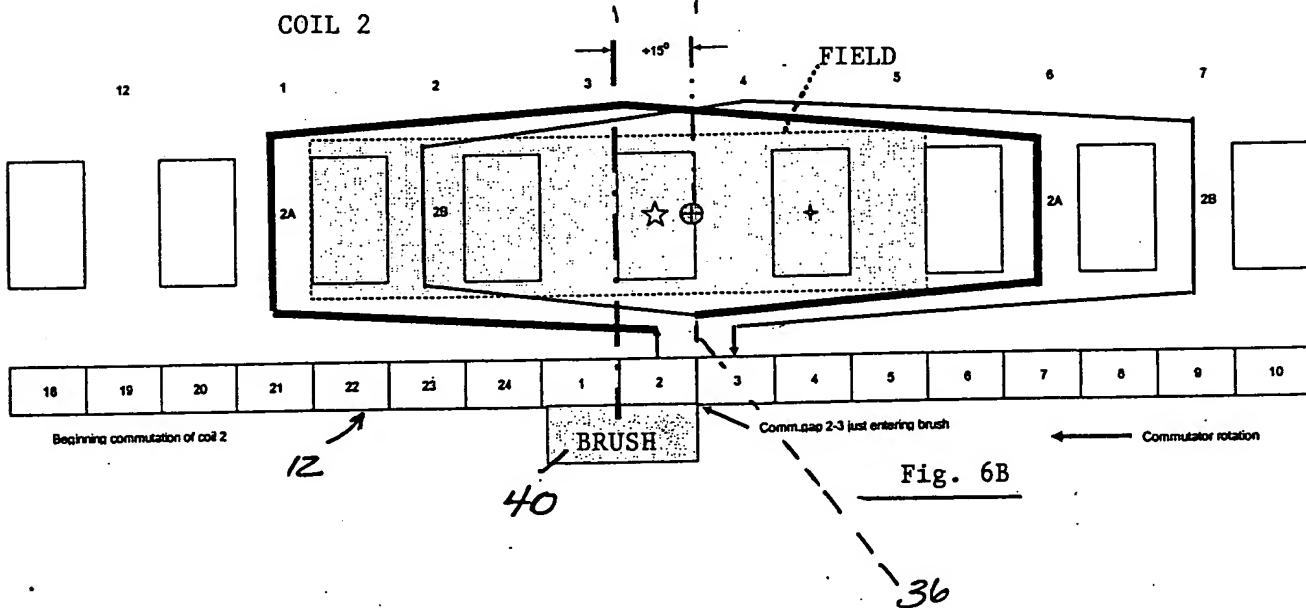
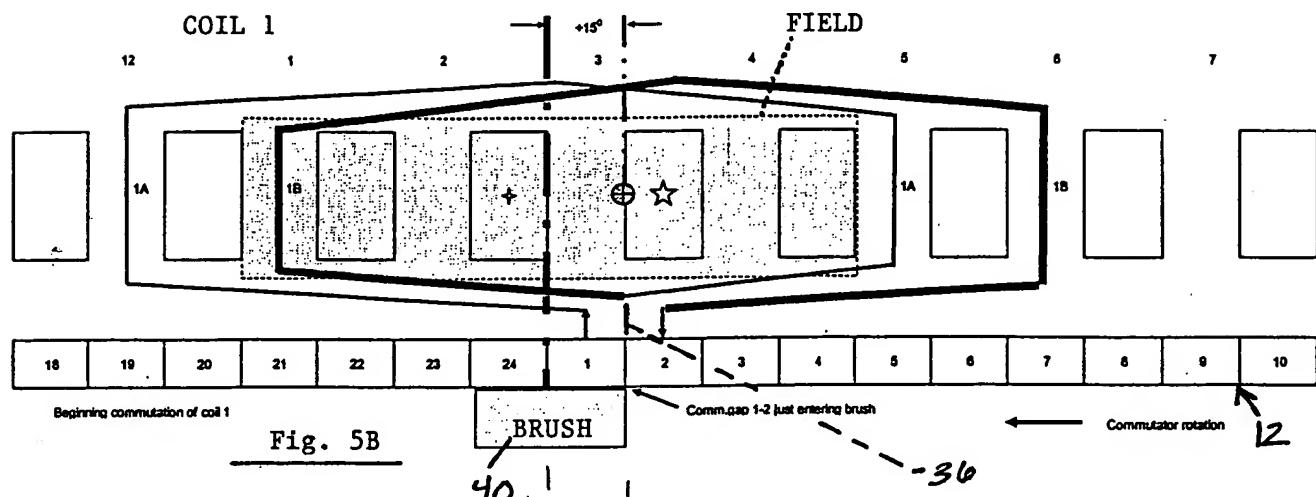
+ Magnetic axis of smaller subcoil

(+) MAGNETIC AXIS of total coil (resultant)

— — — — Axis of field pole and brush

— - - - Position of MAGNETIC AXIS at start of commutation

— - - - Position of MAGNETIC AXIS at end of commutation



Key: ★ Magnetic axis of larger subcoil

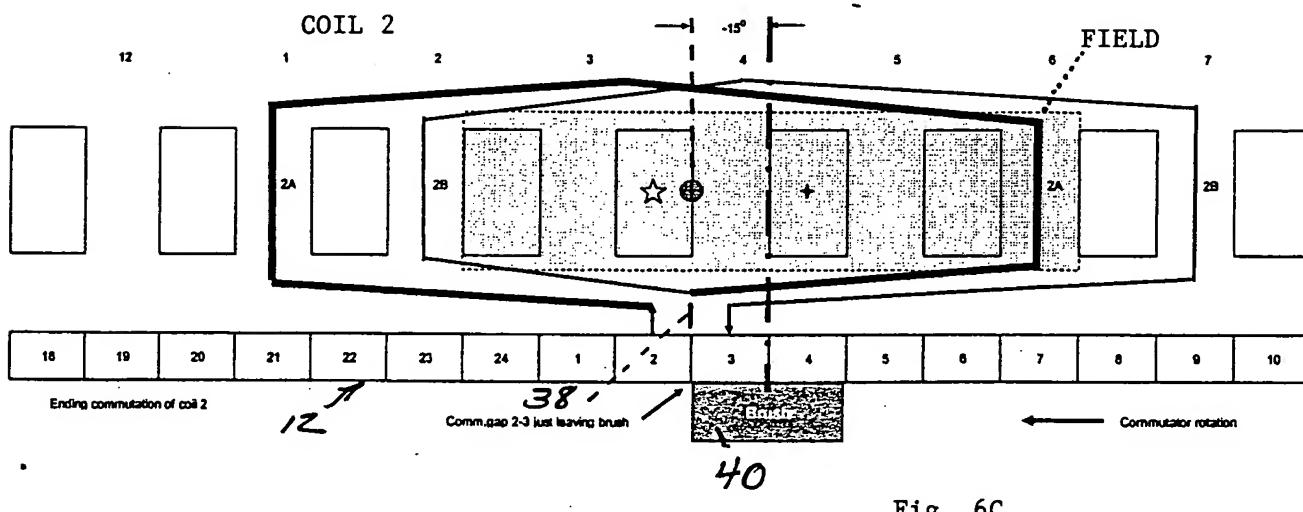
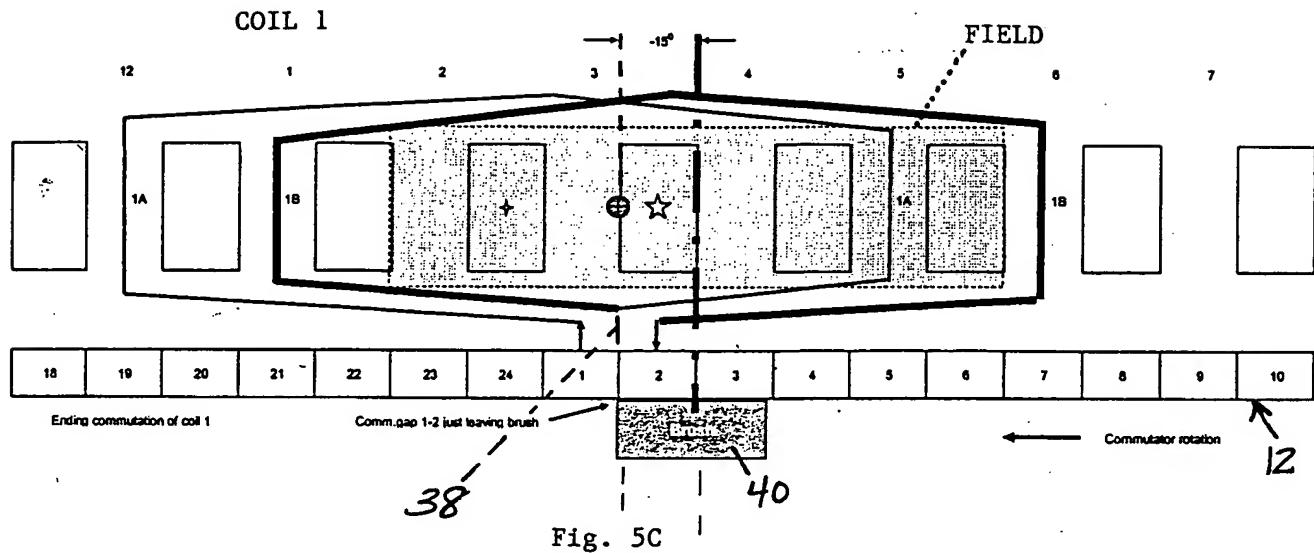
+ Magnetic axis of smaller subcoil

(+) MAGNETIC AXIS of total coil (resultant)

— Axis of field pole and brush

— Position of MAGNETIC AXIS at start of commutation

— Position of MAGNETIC AXIS at end of commutation



Key:

- ★ Magnetic axis of larger subcoil
- ⊕ Magnetic axis of smaller subcoil
- (+) MAGNETIC AXIS of total coil (resultant)

— — — — Axis of field pole and brush

— + — + Position of MAGNETIC AXIS at start of commutation

- - - - - Position of MAGNETIC AXIS at end of commutation

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	Subcoil A slots	Subcoil B slots
1	(12/5) ⁷	(1/6) ¹⁷
2	(1/6) ¹⁷	(2/7) ⁷
3	(1/6) ⁷	(2/7) ¹⁷
4	(2/7) ¹⁷	(3/8) ⁷
5	(2/7) ⁷	(3/8) ¹⁷
6	(3/8) ¹⁷	(4/9) ⁷
7	(3/8) ⁷	(4/9) ¹⁷
8	(4/9) ¹⁷	(5/10) ⁷
9	(4/9) ⁷	(5/10) ¹⁷
10	(5/10) ¹⁷	(6/11) ⁷
11	(5/10) ⁷	(6/11) ¹⁷
12	(6/11) ¹⁷	(7/12) ⁷
13	(6/11) ⁷	(7/12) ¹⁷
14	(7/12) ¹⁷	(8/1) ⁷
15	(7/12) ⁷	(8/1) ¹⁷
16	(8/1) ¹⁷	(9/2) ⁷
17	(8/1) ⁷	(9/2) ¹⁷
18	(9/2) ¹⁷	(10/3) ⁷
19	(9/2) ⁷	(10/3) ¹⁷
20	(10/3) ¹⁷	(11/4) ⁷
21	(10/3) ⁷	(11/4) ¹⁷
22	(11/4) ¹⁷	(12/5) ⁷
23	(11/4) ⁷	(12/5) ¹⁷
24	(12/5) ¹⁷	(1/6) ⁷

Example: (12/5)⁷ = 7 turns around slots 12 and 5

Figure 7

	SLOTS										
	1	2	3	4	5	6	7	8	9	10	11
12											
7 _{1A}	17 _{1B}	7 _{2B}	7 _{4B}	7 _{6B}	7 _{1A}	17 _{1B}	7 _{2B}	7 _{4B}	7 _{6B}	7 _{8B}	7 _{10B}
7 _{12B}	17 _{2A}	17 _{3B}	17 _{5B}	17 _{7B}	7 _{8B}	17 _{2A}	17 _{3B}	17 _{5B}	17 _{7B}	17 _{9B}	17 _{11B}
17 _{13B}	7 _{3A}	17 _{4A}	17 _{6A}	17 _{8A}	17 _{9B}	7 _{3A}	17 _{4A}	17 _{6A}	17 _{8A}	17 _{10A}	17 _{12A}
17 _{14A}	7 _{14B}	7 _{5A}	7 _{7A}	7 _{9A}	17 _{10A}	7 _{10B}	7 _{5A}	7 _{7A}	7 _{9A}	7 _{11A}	7 _{13A}
7 _{15A}	17 _{15B}	7 _{16B}	7 _{18B}	7 _{20B}	7 _{11A}	17 _{11B}	7 _{12B}	7 _{14B}	7 _{16B}	7 _{18B}	7 _{20B}
7 _{22B}	17 _{16A}	17 _{17B}	17 _{19B}	17 _{21B}	7 _{22B}	17 _{12A}	17 _{13B}	17 _{15B}	17 _{17B}	17 _{19B}	17 _{21B}
17 _{23A}	7 _{17A}	17 _{18A}	17 _{20A}	17 _{22A}	17 _{23B}	7 _{13A}	17 _{14A}	17 _{16A}	17 _{18A}	17 _{20A}	17 _{22A}
17 _{24A}	7 _{24B}	7 _{19A}	7 _{21A}	7 _{23A}	17 _{24A}	7 _{24B}	7 _{15A}	7 _{17A}	7 _{19A}	7 _{21A}	7 _{23A}
Total	96	96	96	96	96	96	96	96	96	96	96

Examples:

= 7_{12B} = 7 winding turns of subcoil 12B
= 17_{2A} = 17 winding turns for subcoil 2A

Figure 8